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# *The* **LABOR RESOURCE**

*For Expanding Wood-Using Industries*

*In Northeastern Minnesota*

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LAKE STATES FOREST EXPERIMENT STATION

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FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE

## FOREWORD

In some sections of northeastern Minnesota the sustained cut of timber under forest management practices could be increased manyfold if expanded markets for this raw material were developed. To help expand such markets and thus provide additional economic opportunity for the people and communities of the area, the Station's marketing research staff has conducted a series of intensive analyses of the physical resources that would aid or hinder the increased manufacture and marketing of wood products from northeastern Minnesota.

Labor frequently ranks second only to supplies of suitable raw material as a factor in the location and expansion of wood-using industries. This is particularly true in secondary wood-processing plants where skills, adaptability to training, and a minimum amount of turnover are essential elements of a satisfactory work force.

This report presents a profile of the available labor force in northeastern Minnesota and a resume of probable labor costs. Much of the work on the characteristics of the potential labor supply was done with the cooperation of the Minnesota Department of Employment Security; their aid is gratefully acknowledged.

## CONTENTS

	Page
INTRODUCTION	1
EMPLOYMENT	1
LOCAL AVAILABLE LABOR FORCE AND FOREST INDUSTRY REQUIREMENTS	7
MIGRATION AND MOBILITY OF LABOR	12
LABOR COSTS IN FOREST INDUSTRY	15
SUMMARY	25

## INTRODUCTION

One of the significant factors in an analysis of expanded economic activity is the labor resource. An inadequate labor supply--either in quantity, skills, or adaptability to training--can hamper industrial expansion. Forest industries considering expanding or building plants in northeastern Minnesota need information about the quality and number of persons in the available labor supply. In addition, current labor cost data are required.

This study was undertaken to acquaint industrial and financial leaders in Minnesota and throughout the United States with the characteristics of the available labor resource in northeastern Minnesota (fig. 1, Pine, Carlton, St. Louis, Lake, and Cook Counties) and recent labor costs in the local forest industries. Additional general information is presented on employment, migration, and mobility of labor. Companies planning new plant capacity or new plant locations may find the information useful for comparison with data for other regions and for preliminary assessment of the study counties for plant sites.

The information is presented in four sections. The first section concerns employment in the five-county area and the importance of established forest industry in providing employment. The second presents data on the skills, age, educational attainment, and sex of persons recently looking for permanent employment. This local labor potential is discussed with respect to fulfilling the labor requirements of additional timber industry activity. The third section shows recent migration trends and examples of labor mobility in northern Minnesota which affect the size of the potential labor force. Lastly, the labor cost picture in the study counties during recent years is described.

## EMPLOYMENT

The average number of persons employed in the study counties was less in 1960 than in 1930, although the national average has been rising sharply in recent years. Agricultural employment has dropped to about one-quarter of the 1930 total (table 1).

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Note: The author is a research forester on the staff of the Marketing Research Project of the Lake States Forest Experiment Station. His headquarters are at the Station's field office in Duluth, Minn.

Table 1.--Trend in employment in study area<sup>1/</sup> by industry group

Industry group	Percent of all persons employed				Total employed, 1960
	1930	1940	1950	1960	
Basic industries					
Agriculture	16.7	15.8	10.4	4.4	4,220
Mining	9.1	6.3	10.4	13.1	12,562
Forestry & fisheries	3.1	.4	.4	.4	364
Manufacturing:					
Lumber, wood products and furniture	2.4	2.8	2.8	1.4	1,345
Food processing	1.5	1.9	1.9	2.5	2,409
Printing and publishing	<u>2/</u> 1.5	<u>2/</u> 1.2	1.1	1.6	1,522
All other manufacturing	9.5	<u>2/</u> 6.7	<u>2/</u> 12.1	<u>2/</u> 10.9	10,426
Total (basic industries)	43.8	35.1	39.1	34.3	32,848
Service industries					
Wholesale, retail trade	12.2	16.9	15.6	18.1	17,280
Business, personal, professional	18.7	24.5	20.1	21.9	20,936
Construction	5.1	4.2	4.8	4.9	4,728
Transportation, utili- ties	11.2	10.8	13.0	10.5	10,055
Finance, insurance, real estate	1.9	2.4	2.2	2.9	2,803
Public administration	3.8	5.4	4.0	4.8	4,609
Total (service industries)	52.9	64.2	59.7	63.1	60,411
Industry not reported	3.3	.7	1.2	2.6	2,458
Total (all groups)	100.0	100.0	100.0	100.0	-
Total number of employed	99,027	77,800	99,406	-	95,717

Source: U.S. Census of population - 1930, 1940, 1950, 1960

1/ Includes five counties: Carlton, Cook, Lake, Pine, St. Louis

2/ Includes pulp and paper manufacturing



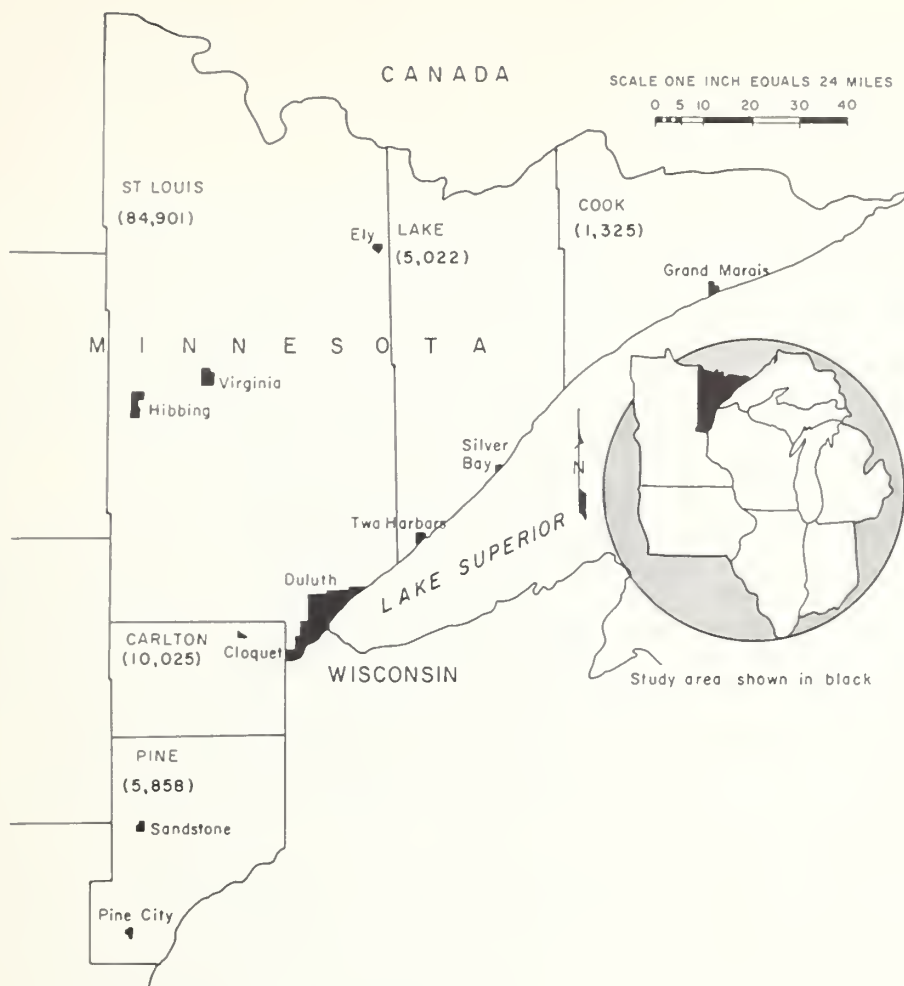


Figure 1.--Location of study counties. The figures in parentheses indicate total county labor force in 1960; source is the U.S. Census of Population, 1960

Service industries (such as wholesale and retail trade, construction, transportation, etc.) contained more than three-fifths of the 95,717 individuals employed in 1960. St. Louis County had 79 percent of the total employment, while sparsely populated Cook County had less than 2 percent.

The most important basic (goods-producing) industries were mining, wood-using, and agriculture. Approximately 6,700 man-years of employment were provided by the wood-using industries in 1962, as shown below:

	<u>Man-years<sup>1/</sup></u>
Logging	2,475
Sawmills and planing mills	165
Pulp, paper, and large specialty plants	3,950
Miscellaneous <sup>2/</sup>	<u>100</u>
Total	6,690

Source: Changes in Northern Minnesota Timber Harvest, A. G. Horn, U.S. Forest Serv. Res. Note LS-11, Lake States Forest Expt.Sta.; Minn. Dept. of Employment Security.

<sup>1/</sup> One man-year is the equivalent of one man working 240 eight-hour days during one calendar year.

<sup>2/</sup> Includes veneer, small specialty, and furniture plants.

More than half of these workers were in pulp, paper, and large specialty products plants, and more than one-third were engaged in logging. About 7 percent of the total employed labor force is directly dependent on wood for a living. But the total population deriving some income from forest industry employment is much larger because many persons are part-time employees. Most of these jobs result from the utilization of nearby timber stands.

Many of the men employed in the study counties in 1960 were highly skilled (table 2). One-fifth were in professional, technical, or

Table 2.--Distribution of skills among the  
employed in the study area, 1960

Occupational group	Number		Percent	
	Male	Female	Male	Female
Prof., tech., and man. <sup>1/</sup>	13,843	5,970	20.7	20.7
Clerical and sales	7,520	9,903	11.2	34.4
Service	3,932	7,938	5.9	27.5
Agriculture	3,198	940	4.8	3.2
Skilled labor	15,514	268	23.2	.9
Semi-skilled labor	16,029	2,427	24.0	8.4
Unskilled labor	4,793	137	7.2	.5
Not reported	2,034	1,271	3.0	4.4
Total	66,863	28,854	100.0	100.0

Source: 1960 Census of Population, Minnesota.

<sup>1/</sup> Professional, technical, and managerial.

managerial positions, and nearly one-quarter were skilled craftsmen (fig. 2). Unskilled laborers accounted for only 7 percent of the male workers in 1960. The ratio of skilled to unskilled workers has probably not changed significantly since then.



Figure 2.--Considerable skill is required of this employee at the Baxter Company in Duluth. He is placing a plastic overlay on particleboard to be used in a counter top. Skilled occupations accounted for nearly one-fourth of those employed in the study counties in 1960.

In 1960 the ages of men in the labor force of northeastern Minnesota were similar to the ages of men working throughout the State. It is often reported that older workers become dominant in depressed areas. This has been true to a limited extent for male workers in the study area. However, the percentage of those over 65 in the study counties was less than the State average in 1960. Age classes of male workers in northeastern Minnesota are shown below:

<u>Age class</u>	<u>Number</u>
14 - 17	2,753
18 - 24	8,602
25 - 34	15,871
35 - 44	17,322
45 - 64	27,880
65 and older	<u>3,657</u>
Total	76,085

Source: 1960 Census of Population, Minnesota

Since 1958 St. Louis County monthly employment has ranged from 89,000 to 71,000 workers, but the average annual labor force has steadily decreased. Within individual years, quarterly employment has varied by at least 6,000 persons from 1958 to 1963 (fig. 3). Seasonal occupations

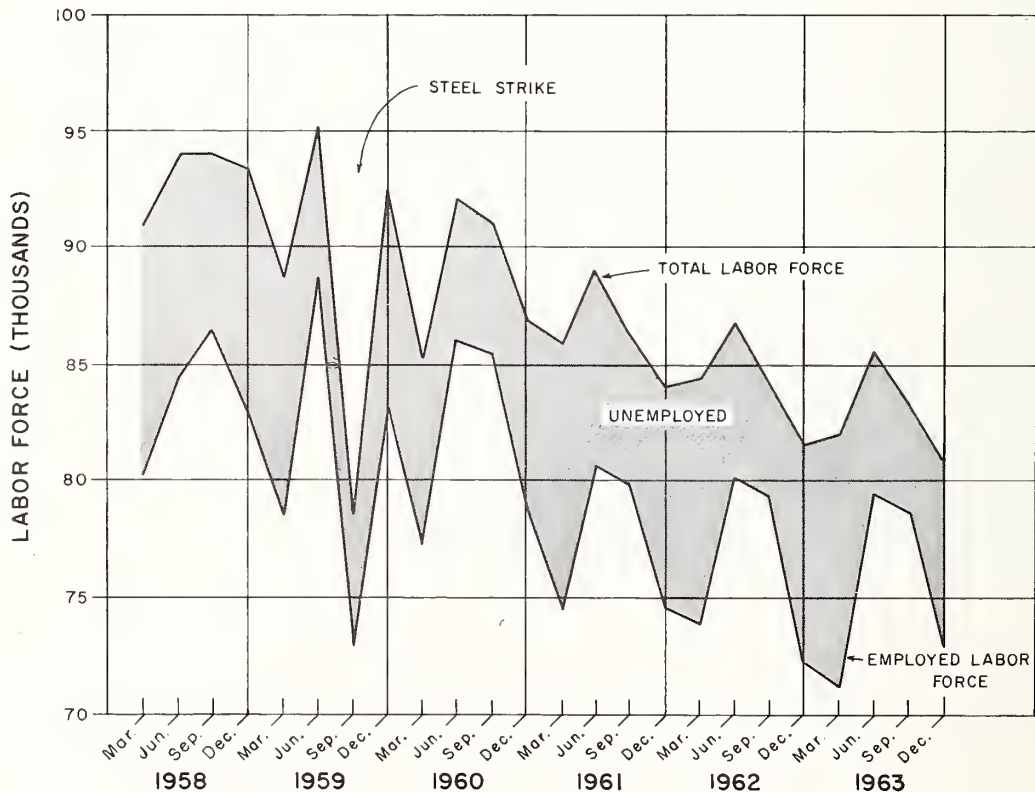


Figure 3.--Quarterly employment trends, St. Louis County, 1958-63. (Source: Minnesota Department of Employment Security.)

such as mining, construction, and resort work are largely responsible for these differences. In the past, logging has been seasonal, but new equipment and techniques are making full-year operations feasible.

The three principal employment centers in the study area are Duluth, Hibbing, and Virginia, all in St. Louis County (fig. 1). Duluth, by far the largest, had 35,870 people employed in April 1963, 960 fewer than a year earlier. In Hibbing 4,974 persons were employed in April 1963, the lowest April figure in the past 5 years. Three years earlier about 7,000 persons were working. Virginia employment in April 1963 was 5,432, about 1,100 fewer than the same month in 1959. The reduction of workers in the Hibbing-Virginia area is a direct result of a contraction of mining activity. Comparative mining employment figures for April in the Virginia area for the past 5 years (1959-63) show a total decrease of about 1,000 with successive decreases occurring each year.

#### LOCAL AVAILABLE LABOR FORCE AND FOREST INDUSTRY REQUIREMENTS

Labor for industrial expansion can come from several sources. The local unemployed are potentially available; employees of other companies may transfer; job applicants from other areas of the State may be interested in relocating; and individuals who have never been employed previously may be hired. Of these, the labor pool most readily available is the local unemployed actively seeking jobs.

The study counties can be characterized as having persistently high unemployment with wide seasonal fluctuations. In St. Louis County, for example, unemployment was never below 5.6 percent since 1958 but was at least 9 percent several months each year (fig. 3). Annual highs and lows occurred in winter and late summer, respectively. As previously mentioned, seasonal variations result from mining, railroad, resort, and construction layoffs and rehiring. The total study area probably has an unemployment pattern similar to that found in St. Louis County.

In May 1963, 6,296 applicants were seeking permanent jobs in the study area through State Employment Offices. These people represented about 80 percent of all individuals actively looking for permanent work. Data on the applicants, grouped by age, education, and type of skill, are shown in table 3 and figure 4. Men outnumbered women almost 4 to 1. More than one-third of the jobless were under 35 years old. Four percent were in the professional, technical, and managerial category, 27 percent were skilled laborers, and another 12 percent were in the clerical and sales field. The remaining 57 percent were in the service, semiskilled, and unskilled categories. More than 38 percent had high school diplomas or college training.

More than one-third of the skilled applicants for work and nearly one-third of the semiskilled and unskilled were high school graduates. Almost one-fourth of the skilled craftsmen, two-fifths of the semiskilled, and 38



Table 3.--Distribution of skills, age classes, and educational levels  
among the unemployed labor resource in northeast Minnesota,<sup>1/</sup>  
May 1963

Occupational group: and educational level	Age class (years)										Total
	Under 21		21-34		35-44		45-64		65 & over		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
<u>Prof., tech., &amp; man.</u>											
Under high school	-	1	8	1	4	-	26	7	8	-	55
High school grad.	2	3	36	5	18	2	34	11	3	-	114
2+ yrs. in college	-	-	12	3	5	-	10	2	-	-	32
College grad.	-	-	17	5	12	3	6	-	6	2	51
Total	2	4	73	14	39	5	76	20	17	2	252
<u>Clerical &amp; sales</u>											
Under high school	1	12	13	25	9	18	22	72	7	3	182
High school grad.	12	49	64	161	25	79	34	116	3	3	546
2+ yrs. in college	-	2	7	7	11	6	3	9	-	-	45
College grad.	-	-	4	-	6	1	-	3	-	-	14
Total	13	63	88	193	51	104	59	200	10	6	787
<u>Service</u>											
Under high school	11	12	39	53	24	48	88	146	27	9	457
High school grad.	1	17	27	35	5	20	18	32	1	1	157
2+ yrs. in college	-	1	2	1	1	1	1	-	-	1	8
College grad.	-	-	-	-	-	-	-	-	-	-	-
Total	12	30	68	89	30	69	107	178	28	11	622
<u>Skilled labor</u>											
Under high school	3	-	147	-	198	2	675	13	60	2	1100
High school grad.	22	2	202	3	144	2	167	1	4	-	547
2+ yrs. in college	-	-	6	-	11	-	15	1	-	-	33
College grad.	-	-	-	-	-	-	3	-	-	-	3
Total	25	2	355	3	353	4	860	15	64	2	1683
<u>Semi-skilled labor</u>											
Under high school	74	10	234	14	215	17	378	13	27	36	1018
High school grad.	39	5	202	9	63	18	50	4	-	16	406
2+ yrs. in college	-	-	4	-	2	-	3	1	-	-	10
College grad.	-	-	2	-	1	-	1	-	-	-	4
Total	113	15	442	23	281	35	432	18	27	52	1438
<u>Unskilled labor</u>											
Under high school	45	1	248	24	160	28	474	54	42	1	1077
High school grad.	54	1	185	12	71	13	67	14	1	-	418
2+ yrs. in college	-	-	10	-	3	-	4	-	-	-	17
College grad.	-	-	1	-	-	-	-	1	-	-	2
Total	99	2	444	36	234	41	545	69	43	1	1514
<u>All occupations</u>											
Under high school	134	36	689	117	610	113	1663	305	171	51	3889
High school grad.	130	77	716	225	326	134	370	178	12	20	2188
2+ yrs. in college	-	3	41	11	33	7	36	13	-	1	145
College grad.	-	-	24	5	19	4	10	4	6	2	74
Total	264	116	1470	358	988	258	2079	500	189	74	6296

1/ Includes all individuals seeking permanent employment through State Employment Offices in five counties--Pine, Carlton, St. Louis, Lake and Cook.

2/ Professional, technical, and managerial.

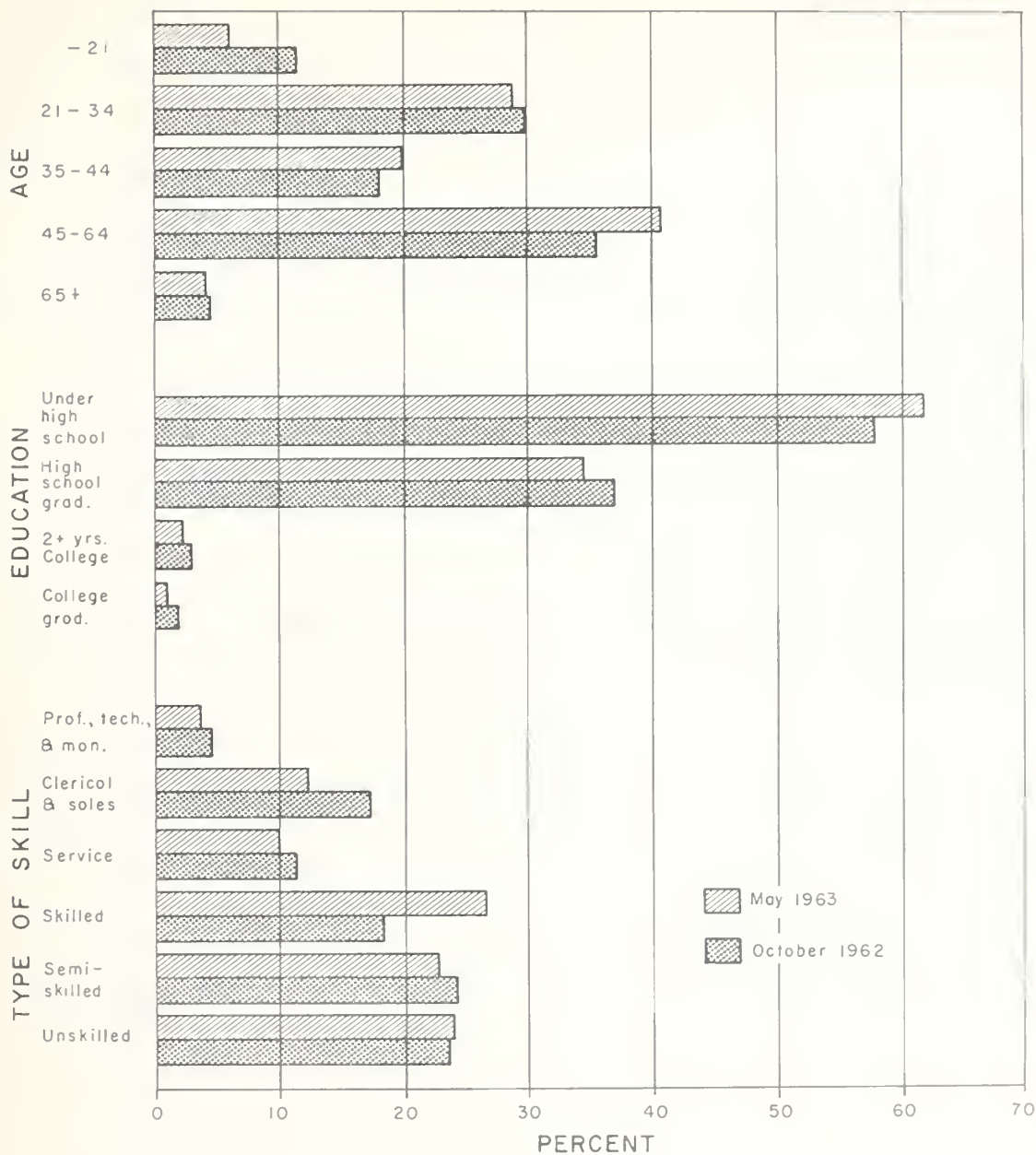


Figure 4.--Distribution of age classes, educational levels, and skills of individuals seeking permanent employment in Minnesota State Employment Offices in the study area, October 1962 and May 1963. (Professional, technical, and managerial are abbreviated in the chart to Prof., tech., and man.)

percent of the unskilled were less than 35 years old. Thus, the study area appears to have a reasonably well educated, skilled, and youthful labor force available.

A similar but earlier study<sup>1/</sup> of applicants in October 1962 disclosed 4,764 persons seeking employment. The composition of this group with respect to age, skills, sex, and educational background varied somewhat from the findings in May (fig. 4). The potential work force in October had a larger percentage of individuals under 35. This higher percentage is partially attributed to 1962 high school graduates who hadn't found employment by October. Few 1962 graduates were enumerated in May; they had found employment or left the area to find work. Only 18 percent were skilled workers in October compared with 27 percent in May. The iron ore docks and transportation facilities at Two Harbors were closed permanently at the conclusion of the 1962 shipping season. As a result, many skilled railroad employees, who had not been recalled in the Two Harbors area in 1963, increased the skilled labor total seeking jobs in May. The percentage of high school graduates was similar in both studies. In October a larger proportion of the applicants were women.

The studies were made in October and May because the effects of seasonal unemployment are probably not a significant influence on the statistics during these months in comparison with a canvass during the winter months. Therefore, the studies more accurately describe the population of applicants desiring permanent employment.

More than half the applicants in May were from the Duluth area (table 4). The Duluth total included 801 skilled, 595 semiskilled, and 744 unskilled laborers. Hibbing and Virginia each had more than 250 skilled people looking for full-time employment. More than half of the 645 people in the "other" category (table 4) were residents in or near Two Harbors.

The study area also has an "underemployed" woods labor potential. The underemployed are farmers, loggers, laborers, etc., who cut timber on a part-time basis. Most of these individuals are not included in unemployment statistics but could probably be counted on for additional woods labor if work were available.

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<sup>1/</sup> The Station's marketing research office in Duluth, in cooperation with the Minnesota Department of Employment Security, made an inventory of active job applications on file in the study area in October 1962 and in May 1963. Those seeking permanent employment in State Employment Offices were counted and classified by age, skills, and educational levels. For a brief discussion of the data for October 1962, see U.S. Forest Service Research Note LS-6 (Lake States Forest Expt. Sta.) 1963.



Table 4.--Number of unemployed applicants by occupational group  
and area of residence, May 1963

Occupational group	Location of applicants <sup>1/</sup>						Total
	Duluth	Hibbing	Virginia	Ely	Pine County	Other <sup>2/</sup>	
Prof., tech., & man. <sup>3/</sup>	186	22	25	0	4	15	252
Clerical & sales	514	137	87	4	23	22	787
Service	389	95	61	10	34	33	622
Skilled labor	801	259	261	72	73	217	1,683
Semiskilled labor	595	286	229	72	122	134	1,438
Unskilled labor	744	212	150	34	150	224	1,514
All occupations	3,229	1,011	813	192	406	645	6,296

<sup>1/</sup> Applicants live in or near cities mentioned.

<sup>2/</sup> Includes following towns scattered throughout study area: Two Harbors, Cloquet, Silver Bay, Grand Marais, and Carlton. More than one-half of these applicants were from the Two Harbors area.

<sup>3/</sup> Professional, technical, and managerial.

Estimates were made of woods and mill labor requirements in man-years for several mill types and sizes (table 5). The mill capacities shown are not necessarily recommended but are used as examples for determining production labor needs. With economies of scale in larger plants, mill labor requirements should decrease per unit of output.

Many persons who were looking for employment in May have skills that could be readily utilized in one or more kinds of forest industry (table 6). No attempt was made to determine the actual number of persons who would accept forest industry employment because too many variables influence decisions concerning job acceptance. However, the 2,000 or more job applicants who were probably suitable for woods or mill employment could fulfill many of the nonprofessional needs of new or expanding timber industries. For example, these applicants could provide the mill and woods labor essential for full-time operation of a 600-ton-per-day chemical pulp mill, 5 sawmills each producing 5 million board feet per year, and a particleboard plant manufacturing 100,000 square feet (5/8" basis) in 24 hours. As an alternative, they could furnish the logging and sawmill manpower necessary for a fourfold increase in the 1960 production of 36 million board feet of lumber in the study counties.

Table 5.--Mill and woods labor requirements  
by plant type and size

Type of plant	:	Capacity	: Mill <u>1/</u> : Woods <u>2/</u>	: employment : employment
	:		: (man-years) :	: (man-years)
Sawmill		5 MM bd.ft./year	11-22	30-40
Chemical pulp		100 tons/24 hrs.	62-80	136-192
Semichemical pulp		50 tons/24 hrs.	19-25	40-60
Groundwood pulp		50 tons/24 hrs.	19-25	36-52
Single-ply veneer		27 MM sq.ft./year	55-80	10-15
Veneer & plywood		27 MM sq.ft./year	75-100	10-15
Hardboard, continuous forming, wet pressing		75 tons/24 hrs.	24-28	55-67
Particleboard		50 M sq.ft./24 hrs. <u>3/</u>	18-20	37-45

1/ Includes production workers only. No supervisory, clerical, or sales and service staff are included.

2/ Assumes no use of residues from other operations and includes all labor from stump to mill.

3/ 5/8" basis.

#### MIGRATION AND MOBILITY OF LABOR

In 1960 the five-county area had a population of 293,603, an increase of 13.1 percent during the previous decade (table 7). Only Pine County lost population from 1950 to 1960, with a decrease of 6.7 percent. The Lake County population spurted 76 percent, primarily because of a new taconite processing installation at Silver Bay.

Although the total population increased during the last decade, net out-migration 2/ from the area was 2 percent (table 8). From 1940 to 1950 the net migration loss was over 13 percent. Only Lake County had a net

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2/ Net out-migration is the net loss of population from a designated area caused by movements of people to other localities in excess of those moving into the area. Population changes caused by births and deaths have been eliminated.

Table 6.--Occupational groups of employment applicants of interest  
to forest industry, by area of residence, May 1963

Occupational group	Location of applicants <sup>1/</sup>						Total
	Duluth	Hibbing	Virginia	Ely	Pine County	Other <sup>2/</sup>	
Prof., tech., & man. <sup>3/</sup>							
Accountant	30	1	1	0	0	0	32
Clerical & sales							
Bookkeeper & re- lated	40	6	9	3	2	3	63
Clerk, gen office	65	29	22	0	6	1	123
Secretary	6	1	5	1	1	1	15
Stenographers	21	10	1	0	2	2	36
Clerk-Typist	38	11	2	0	1	1	53
Skilled labor							
Foreman	14	20	10	2	3	13	62
Metalworker	173	36	38	8	13	28	296
Construction	299	24	87	11	32	60	513
Crane operator	25	26	7	0	4	0	62
Mechanics & repairman	87	56	23	10	8	43	227
Semiskilled labor							
Piece cutter	0	12	20	30	5	0	67
Manufacturing	70	9	6	0	2	3	90
Const. mach. operator	26	22	17	0	17	12	94
Trailer truck driver	21	0	2	0	4	4	31
Heavy truck driver	69	54	39	9	13	21	205
Lift truck operator	4	0	0	1	8	4	17
Unskilled labor							
Sawmill	3	0	0	0	4	1	8
Wood processing	18	2	2	0	0	13	35
Pulp & paper mfg.	7	0	0	0	0	8	15
Transportation	55	25	3	0	0	90	173
Warehousing	137	13	4	0	9	11	174
Total	1,208	357	298	75	134	319	2,391

<sup>1/</sup> Applicants live in or near cities mentioned.

<sup>2/</sup> Includes following towns scattered throughout study area: Two Harbors, Cloquet, Silver Bay, Grand Marais, and Carlton.

<sup>3/</sup> Professional, technical, and managerial.

Table 7.--Population changes in study counties, 1940-1960

County	:	:	:Percent	:	:Percent
	:Population	:Population	:population	:Population	:population
	: 1940	: 1950	:change	: 1960	:change
	:	:	:1940-1950	:	:1950-1960
Carlton	24,212	24,584	+ 1.5	27,932	+ 13.6
Cook	3,030	2,900	- 4.3	3,377	+ 16.4
Lake	6,956	7,781	+ 11.9	13,702	+ 76.1
Pine	21,478	18,223	- 15.2	17,004	- 6.7
St. Louis	206,917	206,062	- 0.4	231,588	+ 12.4
Total	262,593	259,550	- 1.2	293,603	+ 13.1

Source: 1950, 1960 Census of Population, Minnesota.

Table 8.--Migration in study counties

County	:	Net migration <sup>1/</sup> :	Percent	:	Percent
	:	: 1950-1960	:gain or loss	:	:gain or loss
	:	:	: 1950-1960	:	: 1940-1950
Carlton		- 1,076	- 4.4		- 4.4
Cook		- 94	- 3.2		- 17.1
Lake		+ 3,535	+ 45.4		+ 9.4
Pine		- 2,862	- 15.7		- 24.6
St. Louis		- 4,764	- 2.3		- 13.7
Total		- 5,261	- 2.0		- 13.2

Source: Minnesota Dept. of Health, Vital Statistics Section.

<sup>1/</sup> The net change in population during the decade that resulted only from movements of people into or out of a designated area. Population changes caused by births and deaths have been eliminated.

in-migration from 1940 to 1960. Pine County had large losses, which probably included many marginal farmers leaving the area. During the 1950-60 period out-migration in Minnesota occurred primarily in the 0-24

and 55-75 year age groups.<sup>3/</sup> Should the migration trends continue in these age classes in the study area, many young potential workers will be lost to other areas of the country. However, new industrial job opportunities in the area would tend to reverse the migration trend.

A more encouraging condition in northeastern Minnesota is an unemployed labor resource willing to travel considerable distances to find employment. For example, more than 9 percent of the unemployed in Itasca County in June 1961 had previously worked in St. Louis County (table 9).

Table 9.--Mobility of unemployed in northern Minnesota counties,  
June 1961

County of residence	County of last employment (percent)							
	St. Louis	Lake	Carlton	Crow Wing	Aitkin	Itasca	Koochiching	Other <sup>1/</sup>
St. Louis	88.8	3.0	-	-	-	5.4	-	2.8
Carlton	20.5	-	41.0	-	-	-	-	38.5
Aitkin	2.6	-	-	20.7	31.0	13.8	-	31.9
Koochiching	7.3	-	-	-	-	1.6	68.3	22.8
Itasca	9.3	-	-	-	-	77.4	-	13.3

Source: Minnesota Department of Employment Security

<sup>1/</sup> Includes other counties in Minnesota and other States.

Less than one-third of the residents of Aitkin County seeking employment at that time were last employed in that county, and about 3 percent had been employed in St. Louis County. A mobile labor force can significantly increase the available labor beyond those looking for jobs in the immediate area. Thus, the available labor resource in the study counties underestimates the total number of persons willing to work in the area.

#### LABOR COSTS IN FOREST INDUSTRY

Labor costs are a significant factor in total production costs of forest industry. These costs are very important in the Lake States logging

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<sup>3/</sup> Larry A. Sjaastad. Migration and Population Growth in the Upper Midwest: 1930-1960. Upper Midwest Economic Study, Study Paper No. 4, Univ. Minn., July 1962.



and sawmill industries because additional capital inputs and automation have begun to displace labor noticeably only within the last 5 to 10 years.

Direct labor costs are those resulting from salaries, wages, and piece-rate payments. Regional comparisons of wage scales for production workers in 1958 have been made for three segments (logging, sawmill, and pulp and paper) of the timber industry.<sup>4/</sup> The South<sup>5/</sup> and Southeast had large wage rate advantages over other regions in the sawmill and logging segments (fig. 5). Similarly, the Northeast had the lowest wage scales for pulp and paper manufacture, and the South and Southeast had slight hourly pay advantages over the Lake States and Far West.

But productivity of labor when "mixed" with capital inputs according to the policies of management must be considered before comparisons of labor costs are made. Labor costs per unit of output could not be compared directly between regions because of large variances in the use of other factors of production and in the types of products manufactured. As an alternative, production labor costs in 1958 as a percent of value added in manufacturing are used as an indicator of regional labor cost advantages. With the exception of the Northeast, the Lake States had a clear labor cost advantage over other areas in lumber manufacturing (fig. 6). Fifty cents out of each dollar of value added was paid in wages in the Lake States, whereas the South, Southeast, and Far West paid 57, 53, and 56 cents, respectively. Similarly, according to Census of Manufactures data, the Lake States had lower production labor costs in logging than the Southeast and Northeast and only slightly higher costs than the South. Thus, the hourly wage advantage in the Southeast, and most of the hourly wage advantage in the South, were offset by increased productivity in the Lake States. However, wages paid per dollar of value added were high in both the Lake States and the Northeast for pulp and paper production. These higher costs probably resulted from use of relatively older mills and equipment with lower productivity in these northern regions rather than from an inefficient labor resource. Many mills in the South and West are less than 15 years old and have new efficient equipment. Each year productivity becomes more of a function of machines than men in the pulp and paper industry.

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<sup>4/</sup> Information was inadequate for making comparisons of Minnesota or northeastern Minnesota with other states. Accordingly, regional comparisons were made.

<sup>5/</sup> States included within regions are:  
South - Alabama, Arkansas, Louisiana, Mississippi, and Tennessee  
Southeast - Florida, Georgia, North Carolina, South Carolina, and Virginia  
Northeast - Maine, Massachusetts, New Hampshire, New York, and Pennsylvania  
Lake States - Michigan, Minnesota, and Wisconsin  
Far West - California, Idaho, Montana, Oregon, and Washington

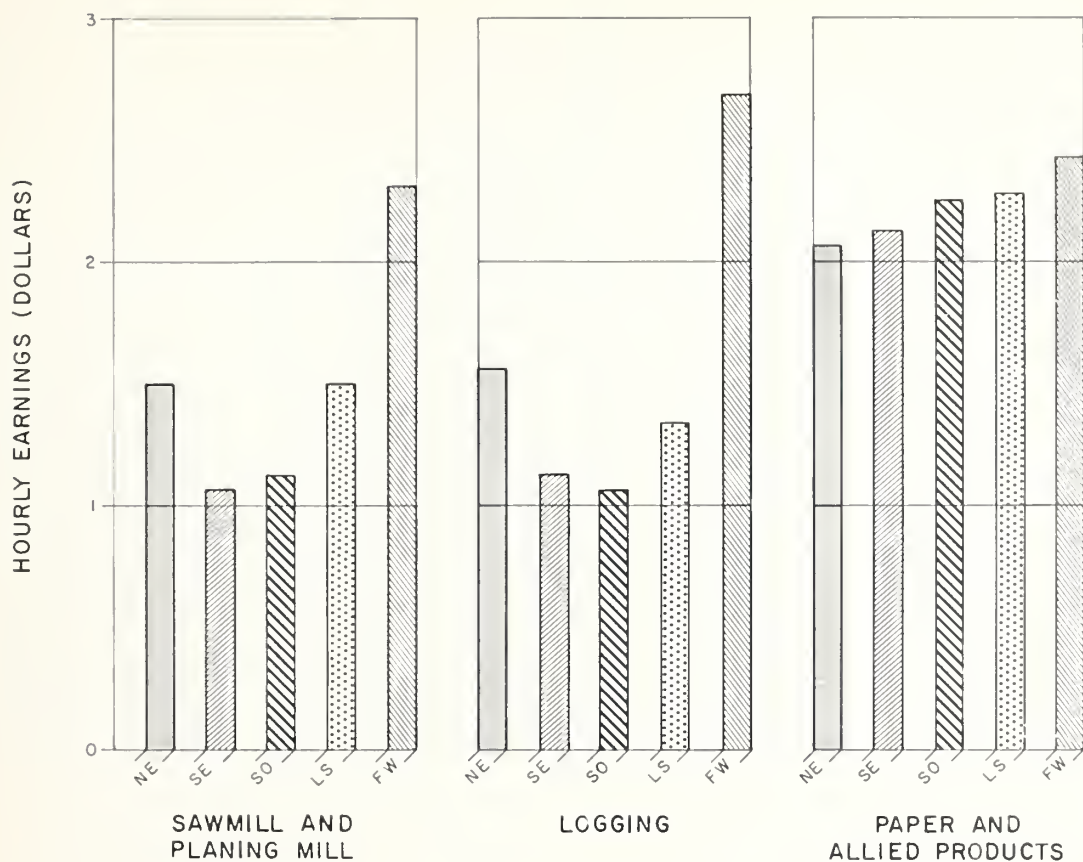


Figure 5.--Average hourly earnings in forest industry by region and type of industry, 1958. NE is Northeast; SE, Southeast; SO, South; LS, Lake States; FW, Far West. (Source: U.S. Census of Manufacturers, 1958.)

During the last 3 years, the overall trend in average hourly earnings has been slightly upward for production workers in Minnesota's lumber and wood products industries, although quarterly variations in average hourly earnings have been large (fig. 7). The lumber and wood products industries include loggers, sawmills, veneer mills, and millwork companies. Average wage rates within each of these segments are dissimilar. For example, millwork employees receive relatively high hourly pay in comparison with sawmill workers. Consequently, abrupt changes in quarterly employment in one of these segments can noticeably affect the average hourly earnings for the whole group of industries. Other factors causing large pay rate variations between quarters are changes in the number of lower paid temporary employees and differences in overtime pay.

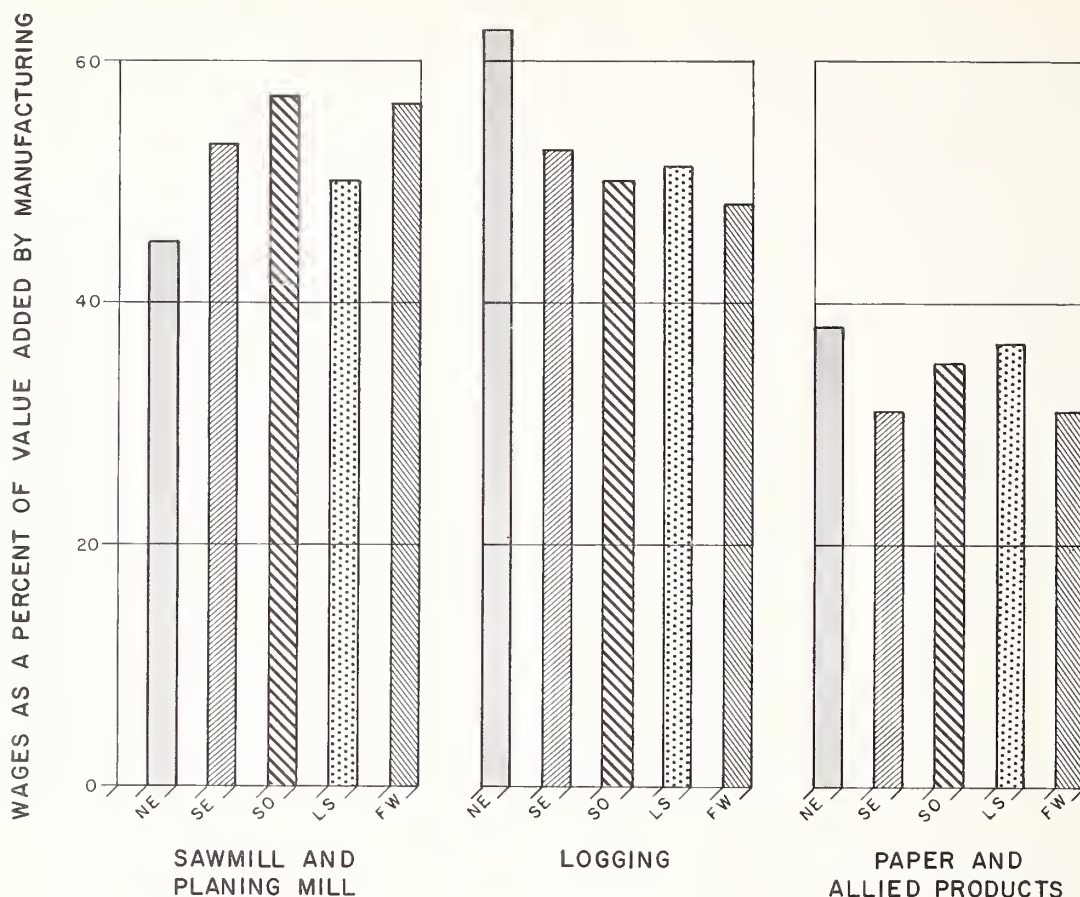


Figure 6.--Regional labor costs of production workers in forest industry, 1958. NE is Northeast; SE, Southeast; SO, South; LS, Lake States; FW, Far West. (Source: U.S. Census of Manufacturers, 1958.)

In contrast, wages in the Minnesota paper industry are not as variable by quarter, but have risen about 13 cents an hour since January 1962 (fig. 7).

High labor turnover rates indirectly increase production costs. Training programs are expensive and productivity is lowered. During 1962, turnover in lumber and other durable wood products firms was high relative to other durable goods industries (table 10). To a certain extent, conclusions based on these statistics are misleading. Few sawmills in Minnesota operate all year; some do custom sawing for only a few weeks, and many are run as part-time enterprises. As a consequence, part-time operations were largely responsible for the high rate of turnover. In 1963 the turnover rate in the lumber and durable wood products group compared favorably with other durable goods industries (table 11). This lower



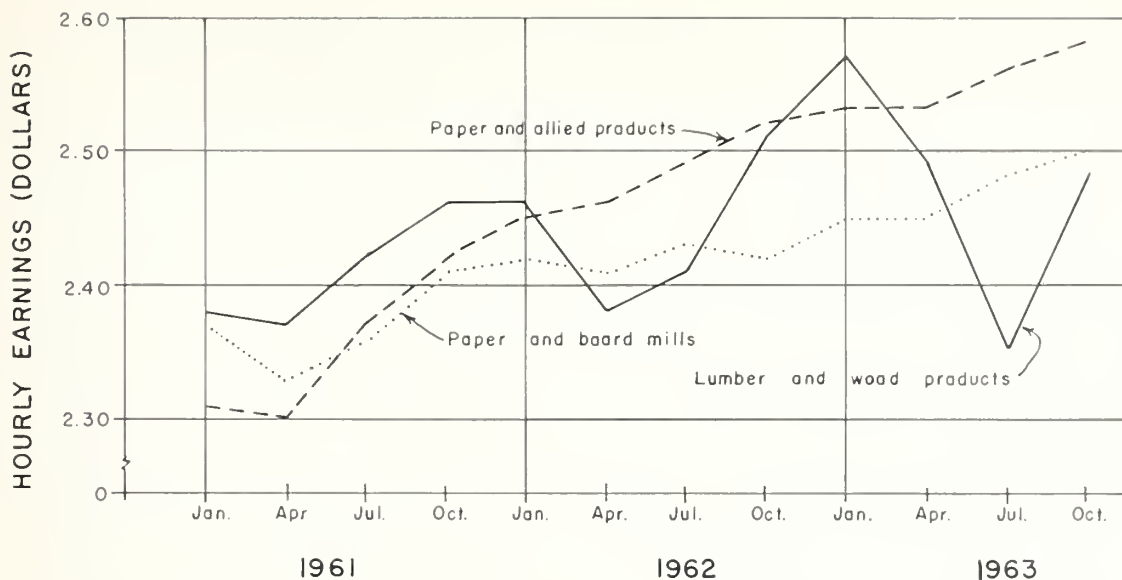


Figure 7.--Quarterly average hourly earnings for production employees in Minnesota forest industries. Paper and board mills are a part of the paper and allied products industry. The lumber and wood products data include logging, sawmill, veneer, and millwork firms. (Source: Minnesota Department of Employment Security.)

turnover rate in 1963 may result from longer periods of manufacturing by part-time operators that year compared to 1962.

The paper industry had a low turnover rate in comparison with other non-durable goods manufacturing (tables 10 and 11). This industry has been a stabilizing force in Minnesota during recession periods, with fewer layoffs than the average for all industry.

Most production employees in the pulp and paper and large specialty forest products firms in northeastern Minnesota belong to the Pulp, Sulphite and Paper Mill Workers Union. Hourly rates in 1962 for occupational specialties of workers in this Union ranged from \$1.62 to \$3.27 (table 12). The highly skilled workers received about \$2.80 to \$3.00 per hour. Unskilled laborers received \$1.62 to \$2.15 per hour.

The International Woodworkers of America represent employees in a few sawmills and 5 to 10 percent of the woods labor in the study area. Union piece rates for pulp cutters vary with the species cut and the top diameter of each stick (table 13). The pulp cutters' piece rates during the 1961-62 cutting season were one-fourth cent to 2 cents per stick higher than during the previous season. Other union logging employees earned \$1.59 to \$1.97 per hour (table 14).

Table 10.--Accession and separation rates for selected industries  
in Minnesota, 1962

(Rates per 100 employees)

Industry	:	:	Durables		:	Non-durables	
	:	All	:	:	:	:Paper & allied products	
	:	:manufacturing:	Total:	Lumber	Total:	:	:Paper and
	:	:	:	& wood	:	Total	:board mills
ACCESSION RATES							
Total							
Jan.	3.9	4.3	3.1	3.6	1.8	2.2	
Apr.	4.7	4.1	10.2	5.4	2.2	1.6	
July	4.1	2.9	3.9	5.2	2.0	1.0	
Oct.	5.5	4.2	3.6	6.7	2.5	2.6	
New hirings							
Jan.	2.1	2.5	1.9	1.8	1.3	.7	
Apr.	2.6	2.5	6.4	2.6	1.9	.8	
July	2.6	2.0	3.2	3.2	1.8	.4	
Oct.	3.5	2.5	2.8	4.5	2.1	1.6	
Other <sup>1/</sup>							
Jan.	1.8	1.8	1.2	1.8	.5	1.5	
Apr.	2.1	1.6	3.8	2.8	.3	.8	
July	1.5	.9	.7	2.0	.2	.6	
Oct.	2.0	1.7	.8	2.2	.4	1.0	
SEPARATION RATES							
Total <sup>2/</sup>							
Jan.	4.0	3.5	4.3	4.6	2.4	4.8	
Apr.	3.3	3.0	4.2	3.7	1.3	1.5	
July	3.9	2.9	2.5	5.0	1.3	.9	
Oct.	5.5	4.0	13.1	7.1	1.9	1.0	
Quits							
Jan.	.9	.9	.7	1.0	.6	.3	
Apr.	1.3	1.2	1.4	1.4	.7	.5	
July	1.4	1.1	1.2	1.8	.9	.5	
Oct.	1.8	1.3	1.4	2.2	.9	.5	
Layoffs							
Jan.	2.4	1.7	3.0	3.1	1.4	4.1	
Apr.	1.4	.9	2.0	1.9	.1	.3	
July	1.9	1.1	.4	2.8	.1	.3	
Oct.	3.1	1.9	11.2	4.4	.7	.3	

Table 11.--Accession and separation rates for selected industries  
in Minnesota, 1963

(Rates per 100 employees)

Industry	:	:	Durables	:	Non-durables	
	:	All	:	Lumber	:	Paper & allied products
	:	manufacturing	Total	& wood	Total	Paper and
	:	:	:	:	:	board mills

ACCESSION RATES

Total						
Jan.	3.9	3.5	6.0	4.2	1.8	1.6
Apr.	4.4	4.1	4.8	4.7	2.0	2.3
July	4.4	3.6	2.1	5.1	2.0	1.2
Oct.	4.5	3.8	3.9	5.1	2.0	2.5
New hirings						
Jan.	1.9	1.8	1.3	2.0	1.3	.3
Apr.	2.3	2.3	3.2	2.2	1.2	.5
July	2.5	2.1	1.6	3.0	1.5	.5
Oct.	2.6	2.0	1.9	3.2	1.6	1.7
Other <sup>1/</sup>						
Jan.	2.0	1.7	4.7	2.2	.5	1.3
Apr.	2.1	1.8	1.6	2.5	.8	1.8
July	1.9	1.5	.5	2.1	.5	.7
Oct.	1.9	1.8	2.0	1.9	.4	.8

SEPARATION RATES

Total <sup>2/</sup>						
Jan.	4.8	3.1	2.3	6.4	1.7	2.9
Apr.	3.8	3.6	2.6	4.0	2.0	2.8
July	4.6	3.4	1.8	5.7	1.3	.9
Oct.	5.0	3.5	2.0	6.5	1.9	1.8
Quits						
Jan.	1.0	.8	.3	1.2	.5	.3
Apr.	1.4	1.4	1.1	1.4	.9	.4
July	1.3	1.1	.8	1.6	.7	.4
Oct.	1.4	1.1	.6	1.7	.9	.6
Layoffs						
Jan.	3.1	1.4	1.3	4.8	.9	2.2
Apr.	1.6	1.1	.4	2.1	.8	2.1
July	2.6	1.5	.7	3.6	.2	.2
Oct.	2.7	1.2	.8	4.2	.6	.9

Source: Minnesota Department of Employment Security

<sup>1/</sup> Includes recalls, transfers, military returnees, etc.

<sup>2/</sup> Separations such as discharges, draftees, etc., are included in the total but not individually because they are negligible.

Table 12.--Union wage rates for employees in pulp, paper, and large specialty products firms in the study area, 1962

Job classification	Rate per hour	Job classification	Rate per hour
Head fireman	\$2.55-2.83	Back tender	\$2.89-3.27
Fireman	2.48-2.52	Paper inspector	1.70-2.60
Working foreman	2.76-2.90	Paper tester	2.14-2.48
Paper machine engineer	2.48	Multilith operator	2.31
First class diesel mech.	2.18-2.73	Trimmerman	2.32-2.42
Coal unloader	2.32	Cutter operator	2.15-2.36
Clerk	2.15	Embosser operator	2.20-2.40
Laborer	1.62-2.15	Stacker and checker	2.20-2.24
Pulp tester	1.70-2.31	Roll finisher	2.21
No. 1 store room clerk	2.29-2.39	Box maker	1.85-2.29
Locomotive engineer	2.61	Car bracer	2.22
Crane operator	2.27-2.61	Shipping crew loader	1.89-2.13
Handyman foreman	1.83-2.73	Carton machine operator	2.15-2.30
Filer	2.40-2.58	Wrapping machine operator	1.90-2.49
Pondman	2.10	Blacksmith	2.55-2.76
Slasher	1.92-2.16	Cement finisher	2.65-2.90
Chipper	2.16-2.35	Machinist	2.10-2.77
Digester cook	2.31-2.71	Millwright foreman	2.63-2.90
Blow pit man	2.20	Millwright	2.13-2.73
Wet room foreman	2.50	Oiler	1.88-2.35
Acid maker	1.94-2.44	Painter	2.26-2.55
Liquor maker	1.94-2.51	Pipefitter	2.73-2.76
Boss loader	1.73-2.22	Tinsmith	2.29-2.73
Pulp handler	1.73-2.18	Welder	2.42-2.86
Bleach room operator	2.04-2.59	Pattern maker	2.90
Bleach maker	1.94-2.29	Beltman	2.55
Beater engineer	3.02	Lift truck operator	1.89-2.32
Clay man	2.20	Truck driver	1.85-2.27
Starch man	2.37	Winderman	2.73
Broke boss	2.39	Electrician	2.16-2.73
Broke man	2.18	Lathe operator	2.07
Machine tender	2.56-3.22	Sawyer	1.92

Source: International Brotherhood of Pulp, Sulphite, and Paper Mill Workers.

Table 13.--Union piece-rate scale for pulp cutters,  
northeast Minnesota, 1961 - 1962

(Rates are per 100" stick unless otherwise indicated)<sup>1/</sup>

<u>PEELED SPRUCE AND BALSAM PULPWOOD</u>		<u>100" ROUGH POPLAR PULPWOOD</u>	
3" top up to 3-1/2"	9-1/4¢	5" top up to 9"	11-1/4¢
3-1/2" top up to 6"	16-1/4¢	9" top up to 12"	19-1/2¢
6" top up to 8"	22-1/4¢	12" top up to 15"	28-1/4¢
8" top up to 10"	43-1/4¢	15" top up to 18"	45-1/2¢
10" top up to 15"	63-3/4¢	18" top and up	68-1/4¢
15" top and up	97-3/4¢	50" poplar pulpwood price to be negotiated at camp	
<u>PEELED JACKPINE PULPWOOD</u>		<u>ROUGH JACKPINE BOX BOLTS</u>	
4" top up to 5"	11¢	5" top up to 8"	11-1/2¢
5" top up to 8"	15-1/2¢	8" top up to 14"	23¢
8" top up to 13"	30-1/4¢	14" top up to 18"	45-1/2¢
13" top and up	69-1/4¢		
<u>PEELED POPLAR PULPWOOD</u>		<u>ROUGH JACKPINE PULPWOOD</u>	
5" top up to 9"	18-3/4¢	4" top up to 5"	6-1/4¢
9" top up to 12"	30-1/4¢	5" top up to 8"	10-3/4¢
12" top up to 15"	42¢	8" top up to 14"	21-1/4¢
15" top up to 18"	63-3/4¢	14" top up to 18"	42¢
18" top and up	76-1/4¢	18" top and up	63-3/4¢
<u>ROUGH SPRUCE, BALSAM &amp; TAMARACK PULPWOOD</u>		<u>100" POPLAR BOX BOLTS</u>	
3" top up to 4"	6-3/4¢	5" top up to 9"	12-1/4¢
4" top up to 7"	10-1/4¢	9" top and up	23¢
7" top up to 10"	18-3/4¢	50" poplar price to be negotiated at camp	
10" top up to 14"	36-1/4¢	50" rough spruce \$9.82 per cd.	
14" top up to 18"	53-1/4¢	50" peeled spruce \$14.95 per cd.	
18" top and up	69-3/4¢		

Source: International Woodworkers of America AFL-CIO

<sup>1/</sup> Where pulpwood cutting rates other than stick rates have been established prior to the effective date of this Agreement, 2 percent shall be added to all rates under \$6.50 per cord, 2 percent shall be added to all peeled spruce and balsam rates where the cord rate is under \$9.50 per cord.

Table 14.--Union hourly wage scale for logging and portable  
sawmill employees, northeast Minnesota, 1961-62

<u>Logging employees</u>	
Blacksmith, large crew	\$1.86½
Blacksmith, small crew	1.77½
Camp carpenter	1.73½
Combination blacksmith and handy man, small crew	1.77½
General woods work, construction labor	1.59
Ground men, cant hook men, chainers, hookers and slack pullers	1.63
Handyman, first class	1.73½
Handyman's helper	1.59
Hookman, decking power	1.63
Sawyers, pulp, tie cuts	1.59
Sawyers, logs	1.63
Saw filer	1.75½
Stationary and portable gas jammer operator	1.70½
Strippers	1.63
Teamsters - 4 horse	1.70½
Teamsters - 2 horse	1.63
Teamsters - 1 horse	1.60½
Teamsters, cross haul	1.63
Top decker, power	1.70½
Top loader, sleighs, trucks, power	1.79
Top loader, helper	1.59
Top loader, sleigh haul, horse jammer	1.65
Caterpillar driver, D-4,T.D. 9,and larger	1.87
Caterpillar driver, D-2,T.D. 6,and smaller	1.85
Bulldozer operator, D-4,T.D. 9,and smaller	1.92
Bulldozer operator, D-6,T.D. 14,and larger	1.97
Caterpillar helper	1.60
Power saw operator	1.85
Maintenance mechanic	1.92
Pulpwood slasher operator	1.85

Portable sawmill employees	Less than 10 MBF	10 MBF to 20
	capacity/day <sup>1/</sup>	MBF per day <sup>1/</sup>
Deckman	\$1.65	\$1.70
Dogger	1.60	1.65
Setter	1.77	1.82
Filer	1.87	1.92
Sawyer	1.97	2.08
Tail sawyer	1.60	1.65
Edgerman	1.83	1.88
Pick edgings	1.60	1.65
Trimmer	1.70	1.75
Slabs	1.60	1.65
Piling lumber	1.65	1.70
Handling lumber	1.60	1.65
Teamsters	1.65	1.65

Source: International Woodworkers of America AFL-CIO

<sup>1/</sup> MBF = thousand board feet



Organized employees in stationary or semi-stationary sawmills are paid \$1.60 to \$2.20 an hour. Union members working in portable sawmills earn slightly less (table 14).

Union membership by sawmill and logging employees is primarily concentrated in St. Louis, Lake, and Cook Counties. The unorganized sawmill and woods laborers may receive lower average piece rates or hourly earnings.

Average felling, bucking, and skidding costs per cord of pulpwood in 1962 ranged from \$9.40 for rough jack pine to \$16.81 for peeled spruce in the study area (table 15). Average loading costs were \$.67 per cord for rough pulpwood or \$.75 per cord if peeled.

Table 15.--Average pulpwood logging costs  
in study area by species, 1962

(Per cord)

Logging cost function	: : Rough : spruce :	: : Peeled : spruce :	: : Peeled : aspen :	: : Rough : jack pine :	: : Rough : balsam fir :
Fell, buck & skid	10.96	16.81	12.12	9.40	10.95
Loading	.67	.75	.75	.67	.67
General logging <sup>1/</sup>	1.37	1.82	1.74	1.38	.49

Source: U.S. Forest Service

<sup>1/</sup> General logging costs include owner-manager supervision, office overhead and other miscellaneous indirect costs.

## SUMMARY

At least 7 percent of the total employed labor resource in the study area is directly dependent on wood for a living (fig. 8). For several years the study counties have been plagued with high unemployment and wide seasonal employment fluctuations. Permanent job applicants in northeastern Minnesota, the most certain source of labor for new or expanding industry, appear to be relatively well educated, skilled, and youthful. This local labor supply, numbering more than 6,200 in May 1963, seems adequate to fulfill the nonprofessional needs of most new or expanding timber industries. More than one-third of this potential work force in May had skills adequate or adaptable to use in wood-processing plants or logging. A relatively mobile group of work applicants in other northern Minnesota counties probably adds significantly to the available manpower.

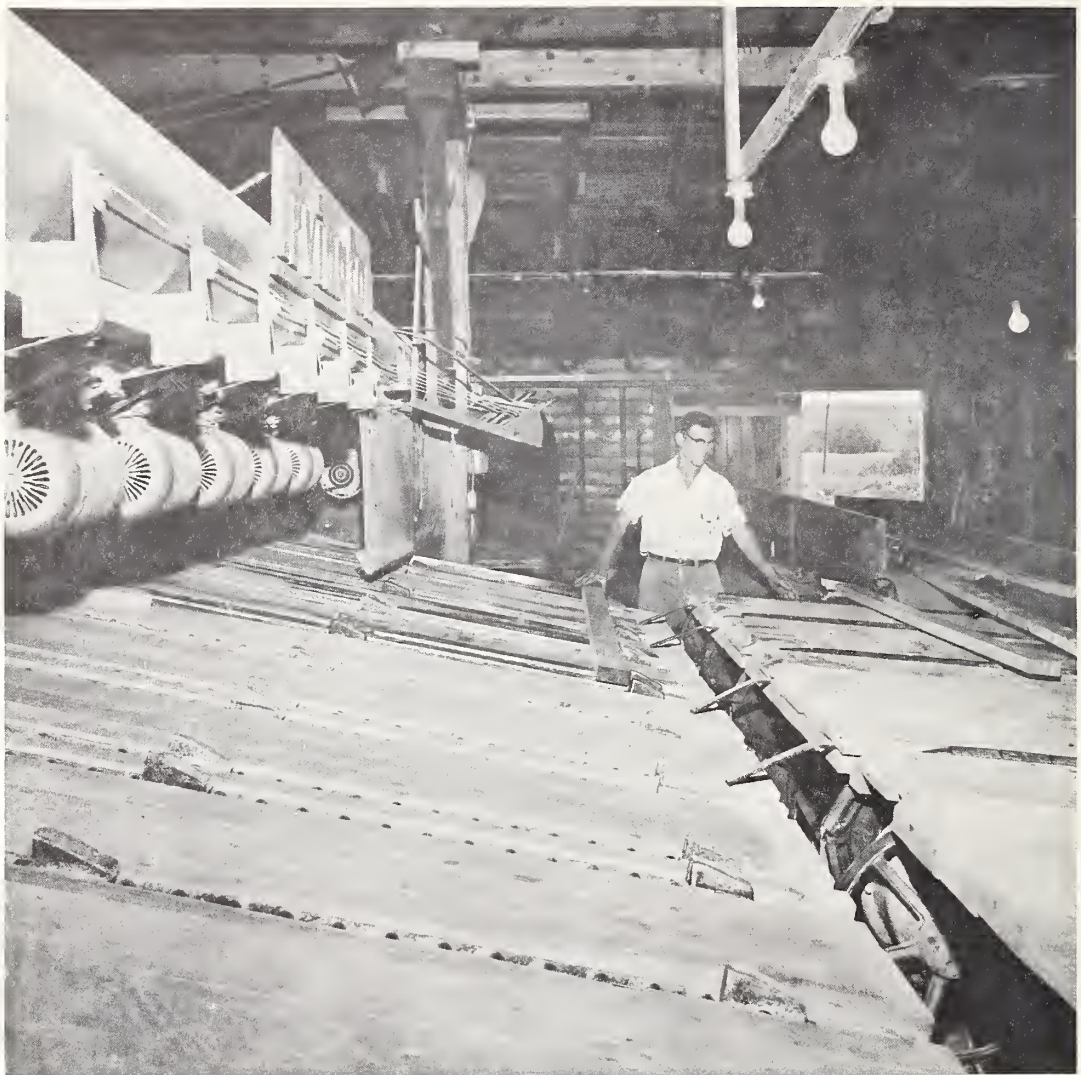


Figure 8.--Trimmerman working in the planing mill at Keewatin Sawmill Company near Hibbing. Sawmills and planing mills provide 165 man-years of employment annually in the study area.



Labor costs are quite variable by type of forest industry. Logging and sawmilling labor costs in 1958, as a percent of value added in manufacturing, are favorable in the Lake States in comparison with other regions. Similar comparisons of 1958 costs in the pulp and paper industry show, at first glance, the Lake States to be a high labor cost area. However, the Lake States mills and equipment are relatively older and probably less efficient than the new modern facilities in the South and West. Productivity increases generated from these new automated plants have lowered labor costs per unit of value added. Lake States labor costs would probably be lowered accordingly if the mills were new or refurbished with electronic automated processing equipment. To a considerable extent, productivity is becoming more a function of machines than men in the pulp and paper industry.

In the study counties, skilled employees in pulp and paper manufacturing received \$2.80 to \$3.00 per hour in 1962. Hourly wages for unskilled labor ranged from \$1.60 to \$2.00. A small number of sawmill employees are unionized with hourly earnings of \$1.60 to \$2.20. About 5 to 10 percent of the logging laborers are organized. Hourly logging employees in the Woodworkers Union received \$1.59 to \$1.97 per hour in 1961-1962. Many pulp cutters are hired on a piece-rate basis.



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